Knowledge Management within the Canadian Defence Environment

BARBARA T. WARUSZYNSKI, DS
Directorate of Science and Technology Policy

DEFENCE R&D CANADA
DEPARTMENT OF NATIONAL DEFENCE

TECHNICAL MEMORANDUM
DRDC TM 2001-008
December, 2001

104-06918/

Author

Barbara T. Waruszynski
Defence Scientist

Approved by

Dr. Ingar Moen
Director of Science and Technology Policy

Approved for release by

Dr. Ingar Moen
Director of Science and Technology Policy

The reported analysis, interpretations, and opinions expressed therein, remain those of the author and do not represent, or otherwise reflect, any official opinion or position of the Department of National Defence or the Government of Canada.

© Her Majesty the Queen represented by the Minister of National Defence, 2001.
© Sa majesté la reine, représentée par le ministre de la Défense nationale, 2001.

Abstract

An interactive knowledge management (KM) workshop was conducted to assess the current perceptions and future directions of KM within the Department of National Defence (DND) and the Canadian Forces (CF). The main objective of the workshop was to determine if DND/CF should be moving towards a KM strategy. The following paper documents the results of the workshop, focusing on two particular themes: (i) the current perceptions of KM, including the elements for capturing, using, sharing and reusing knowledge within DND/CF; and (ii) the future directions and implications of investing in a DND/CF KM strategy. Several key findings are put forward for understanding the application of KM to the Canadian defence environment. First, DND/CF should be moving towards a KM strategy. Second, the key enablers for fostering a KM environment within DND/CF are leadership and information management/information technology. Third, the KM strategy should incorporate both the corporate and operational environments. Fourth, working within internal and external communities is essential for communicating and networking on emerging issues in defence. Fifth, tools and technologies should be developed to promote collaboration, greater communication and access to information. Finally, the investment in people within organizations is the most important component of knowledge leveraging.

DRDC TM 2001-008.

Résumé

Un atelier interactif sur la gestion du savoir (GS) a été organisé afin d'évaluer les perceptions actuelles et les orientations futures de la GS au sein du ministère de la Défense nationale (MDN) et des Forces canadiennes (FC). Le principal objectif de l'atelier consistait à déterminer si le MDN et les FC devaient adopter une stratégie de GS. Le rapport qui suit présente les résultats de l'atelier en mettant l'accent sur deux thèmes particuliers : i) les perceptions actuelles de la GS, y compris les éléments servant à obtenir, à utiliser, à partager et à réutiliser les connaissances au sein du MDN et des FC; ii) les orientations futures et les répercussions d'un investissement dans une stratégie de GS pour le MDN et les FC. On avance plusieurs constatations clés pour faire comprendre l'application de la GS à l'environnement de défense canadien. Premièrement, le MDN et les FC devraient adopter une stratégie de GS. Deuxièmement, les principaux outils favorisant l'établissement d'un environnement de GS au sein du MDN et des FC sont le leadership et la gestion/technologie de l'information. Troisièmement, la stratégie de GS devrait s'appliquer tant au milieu ministériel qu'au milieu opérationnel. Quatrièmement, il est essentiel de travailler avec les communautés internes et externes pour assurer la communication et la collaboration en ce qui concerne les nouveaux problèmes qui se posent en matière de défense. Cinquièmement, il faudrait mettre au point des outils et des technologies qui favorisent la collaboration, une meilleure communication et l'accès à l'information. Enfin, l'investissement dans les gens au sein de l'organisation constitue l'aspect le plus important de l'exploitation du savoir.

RDDC TM 2001-008.

Executive Summary

An interactive knowledge management (KM) workshop was conducted to assess the current perceptions and future directions of KM within the Department of National Defence (DND) and the Canadian Forces (CF). The main objective of the workshop was to determine if DND/CF should be moving towards a KM strategy. The following paper documents the results of the workshop, focusing on two particular themes: (i) the current perceptions of KM, including the elements for capturing, using, sharing and reusing knowledge within DND/CF; and (ii) the future directions and implications of investing in a DND/CF KM strategy.

Eleven participants took part in the workshop. These individuals were identified as key Departmental/CF representatives engaged in knowledge leveraging initiatives. To facilitate the process, an interactive computer-based system, known as GroupSystems®, was employed to stimulate and facilitate discussion, generate ideas and come to some form of consensual decision-making on particular issues.

The participants saw KM as a means to bring together information management and information technology, human capital and leadership to enable knowledge sharing. The specific tools and technologies that enable people to capture, use, share and reuse their knowledge ranged from knowledge portals to career management systems. Techniques involving networked groups were deemed important for sharing and communicating knowledge (e.g., communities of practice, communities of interest, joint working groups, and informal group settings). These groups encourage free-flowing discussions to stimulate creative ideas and approaches to problem solving and decision-making.

Similarities between KM for the corporate and operational environments were identified in the workshop, including those associated with processes and information. Contextual issues and the reliability of information during operations highlighted the main differences between the environments. Internal partnerships were seen to focus around collaborative associations with other level one organizations, advisory groups, boards, and committees. External partnerships were seen to mainly focus around the Canadian Federal Government, international militaries and other related communities. The benefits, risks and costs of the key KM implementation issues were also examined.

Finally, a survey was conducted to determine group perceptions of investing in a Departmental KM strategy. The majority of the group who participated in the survey (five out of seven) agreed that DND/CF should be moving in this direction. Although the majority were in agreement with the need for a KM strategy, participants were neutral on assessing if the benefits would outweigh the risks and costs.

Several key findings are put forward for understanding the application of KM to the Canadian defence environment. First, DND/CF should be moving towards a KM strategy. Second, the key enablers for fostering a KM environment within DND/CF are leadership and information management/information technology. Third, the KM strategy should incorporate both the corporate and operational environments. Fourth, working within internal and external communities is essential for communicating and networking on emerging issues in defence. Fifth, tools and technologies should be developed to promote collaboration, greater communication and access to information. Finally, the investment in people within organizations is the most important component of knowledge leveraging.

Based on the results of the workshop, the following six recommendations are put forward: (i) develop a common understanding of KM and differentiate it from information management; (ii) identify and link the current KM-related practices within DND/CF; (iii) explore the KM needs and requirements for the corporate and operational environments; (iv) examine the architectural environment (i.e., the tools, technologies and techniques) for understanding how knowledge can be better leveraged across organizations/units; (v) quantify the benefits, risks and costs involved in the development and implementation of a defence KM strategy; and (vi) invest in the learning process that incorporates KM values and principles.

Waruszynski, B. 2001. Knowledge Management within the Canadian Defence Environment. DRDC TM 2001-008. Directorate of Science and Technology Policy.

Sommaire

Un atelier interactif sur la gestion du savoir (GS) a été organisé afin d'évaluer les perceptions actuelles et les orientations futures de la GS au sein du ministère de la Défense nationale (MDN) et des Forces canadiennes (FC). Le principal objectif de l'atelier consistait à déterminer si le MDN et les FC devaient adopter une stratégie de GS. Le rapport qui suit présente les résultats de l'atelier en mettant l'accent sur deux thèmes particuliers : i) les perceptions actuelles de la GS, y compris les éléments servant à obtenir, à utiliser, à partager et à réutiliser les connaissances au sein du MDN et des FC; ii) les orientations futures et les répercussions d'un investissement dans une stratégie de GS pour le MDN et les FC.

Onze personnes ont participé à l'atelier. Il s'agissait de représentants clés du Ministère et des FC engagés dans des initiatives d'exploitation du savoir. Pour faciliter le processus, on a eu recours à un système informatique interactif, appelé GroupSystems®, qui a stimulé et facilité la discussion, produit des idées et aidé à parvenir à une certaine forme de prise de décision consensuelle sur des questions particulières.

Les participants considéraient la GS comme un moyen de combiner la gestion et la technologie de l'information, le capital humain et le leadership afin d'assurer le transfert du savoir. Les outils et des technologies spécifiques qui ont permis aux gens d'obtenir du savoir, de l'utiliser, de le partager et de le réutiliser allaient des portails du savoir aux systèmes de gestion de carrière. Les techniques de réseautage de groupes ont été jugées importantes pour la transmission et la communication du savoir (p. ex., communautés de pratiques, communautés d'intérêts, groupes de travail mixtes, formations de groupes spontanées). Ces groupes favorisent la discussion libre, qui stimule des idées et des approches créatives pour la résolution de problèmes et la prise de décisions.

Durant l'atelier, on a établi des similitudes entre la GS destinée au milieu ministériel et à celle réservée au milieu opérationnel, y compris des similitudes touchant les processus et l'information. Il y a également des ressemblances au niveau des processus et de l'information. Les deux milieux se distinguaient principalement par des questions de contexte et la fiabilité de l'information durant les opérations. Les partenariats internes semblaient s'articuler autour d'associations collaboratives avec d'autres organisations de niveau un, des groupes, des commissions et des comités consultatifs. Quant aux partenariats externes, ils semblaient surtout axés sur le gouvernement fédéral du Canada, les organisations militaires internationales et d'autres communautés connexes. Les avantages, les risques et les coûts des activités clés touchant la mise en œuvre de la GS ont été étudiés.

Enfin, un sondage a permis de déterminer ce que les groupes pensent de l'investissement dans une stratégie ministérielle de GS. La majorité des groupes (cinq sur sept) convenaient que le MDN et les FC devraient s'orienter dans cette direction. Bien que la plupart reconnaissent le besoin d'une stratégie de GS, les participants ne se prononçaient pas quant à déterminer si les avantages l'emporteraient sur les risques et les coûts.

On avance plusieurs constatations clés pour faire comprendre l'application de la GS à l'environnement de défense canadien. Premièrement, le MDN et les FC devraient adopter une stratégie de GS. Deuxièmement, les principaux outils favorisant l'établissement d'un environnement de GS au sein du MDN et des FC sont le leadership et la gestion/technologie de l'information. Troisièmement, la stratégie de GS devrait s'appliquer tant au milieu ministériel qu'au milieu opérationnel. Quatrièmement, il est essentiel de travailler avec les communautés

internes et externes pour assurer la communication et la collaboration en ce qui concerne les nouveaux problèmes qui se posent en matière de défense. Cinquièmement, il faudrait mettre au point des outils et des technologies qui favorisent la collaboration, une meilleure communication et l'accès à l'information. Enfin, l'investissement dans les gens au sein de l'organisation constitue l'aspect le plus important de l'exploitation du savoir.

Suite aux résultats de l'atelier, les six recommandations suivantes ont été formulées : i) élaborer une vision commune de la GS et la différencier de la gestion de l'information; ii) identifier les pratiques actuelles liées à la GS au sein du MDN et des FC et établir un lien entre elles; iii) déterminer les besoins et les exigences des milieux ministériel et opérationnel en matière de GS; iv) examiner l'environnement architectural (c.-à-d. outils, technologies et techniques) afin de comprendre la façon de mieux exploiter le savoir dans toutes les organisations/unités; v) quantifier les avantages, les risques et les coûts qu'occasionneront l'établissement et la mise en oeuvre d'une stratégie de GS en matière de défense; vi) investir dans le processus d'apprentissage qui englobe les valeurs et principes de la GS.

Waruszynski, B. (2001). La gestion du savoir dans l'environnement de défense canadien. TM 2001-008. Direction de la politique scientifique et technologique.

Table of Contents

Abstract i
Résumé ii
Executive Summary iv
Sommaire vi
Table of Contents viii
Tables ix
Acknowledgements x
1 Introduction 1
2 Research Approach and Methodology 2
3 Results 3
Current Perceptions of Knowledge Management 4
Future Directions of Knowledge Management 12
4 Application of Knowledge Management in the Canadian Defence Environment—
Discussion of Key Findings 25
5 Conclusion 29
6 Recommendations 30
7 References 31

Tables

Table 1 Participants' Expectations of Participating in Workshop 4
Table 2 Perceptions of Knowledge Management Fitting into Own Organization 5
Table 3 Enablers for Fostering a Knowledge Management Environment 6
Table 4 Barriers to Fostering a Knowledge Management Environment 7
Table 5 Tools and Technologies for Knowledge Workflows 8
Table 6 Knowledge Management Techniques 9
Table 7 Similarities Between Knowledge Management for the Corporate and Operational Environments 10
Table 8 Differences Between Knowledge Management for the Corporate and Operational Environments 10
Table 9 Examples of Internal Partnerships in Leveraging Knowledge 11
Table 10 Examples of External Partnerships in Leveraging Knowledge 12
Table 11 Enablers to Knowledge Management: Benefits, Risks and Costs 14
Table 12 Barriers to Knowledge Management: Benefits, Risks and Costs 15
Table 13 Tools and Technologies for Knowledge Management: Benefits, Risks and Costs 16
Table 14 Techniques for Knowledge Management: Benefits, Risks and Costs 17
Table 15 Similarities Between Knowledge Management for the Corporate and Operational Environments: Benefits, Risks and Costs 18
Table 16 Differences Between Knowledge Management for the Corporate and Operational Environments: Benefits, Risks and Costs 19
Table 17 Internal Collaborative Partnerships: Benefits, Risks and Costs 19
Table 18 External Collaborative Partnerships: Benefits, Risks and Costs 20
Table 19 We should be moving towards a KM strategy. 21
Table 20 The benefits of a KM strategy outweigh the 'costs'. 22
Table 21 The benefits of a KM strategy outweigh the 'risks'. 22
Table 22 The KM strategy would be the same for the Warfighter as for the Corporate environment. 23
Table 23 Involvement in Knowledge Management—Occupational Groups 23
Table 24 Level of Agreement on DND/CF Organizational Groups 24

Acknowledgements

I would like to thank the following participants who took part in the Interactive Knowledge Management Workshop and agreed to be acknowledged in this report:

Raymond Carbonneau
Defence Scientist/Chief Scientist Joint Force Development
Director General Joint Force Development

Bryan Gallimore
Section Head—Data Architecture
Directorate Enterprise Architecture (DEA 5) DG IMSD

Marlene Gauvin
Defence Scientist, Information and Knowledge Management
Defence Research Establishment Valcartier, Defence R&D Canada

Maj Darren Harper
Project Director, Command and Control Information Systems
Chief Air Staff/Directorate Aerospace Requirements (DAR 4-2)

Maj J.C. Phil Jourdeuil
Deputy Project Director Canadian Forces Command System
Director General Joint Force Development (DJFC 2-2)

LCol Serge Lecours
Director Air Programs 5 (Command and Control/Information Management)
Directorate of Air Programs

Susan McIntyre
Policy Analyst
Defence R&D Canada

Grace Paduano
Strategies and Policies Learning Advisor
Director, Learning and Professional Development Strategies and Policies (DLPDSP)

Cdr Lee Reed
Maritime Staff Change and Risk Management
Chief Maritime Staff

Marilou Rooke
Section Head—Information Architecture and Standards
Information Management Group / DGIMCS/ DKIM 3

I would also like to thank ***Ivan Taylor*** and ***Ann Burns*** for helping to finalize the agenda and to facilitate the workshop activities.

KNOWLEDGE MANAGEMENT WITHIN THE CANADIAN DEFENCE ENVIRONMENT

1 Introduction

Knowledge Management (KM) is a broad interdisciplinary paradigm for leveraging knowledge. KM is depicted as an organizational strategy for enabling more effective processes, tools and techniques for knowledge capture, use and transfer. Within this rapidly developing discipline, a range of methods for knowledge acquisition, modeling, representation and automated reasoning are being developed. It draws upon sociological, psychological, mathematical and technological methods for optimizing knowledge flows. As a result, KM is being employed as a strategy for fostering ideas and techniques for enhancing organizational performance.

For this workshop, the working definitions for knowledge management were:

> *The conscious strategy of putting both tacit and explicit knowledge into action by creating context, infrastructure, and learning cycles that enable people to find and use the collective knowledge of the enterprise (APQC, 2000).*
>
> *A conscious strategy of getting the right knowledge to the right people at the right time; and helping people share and put information into action in ways that strive to improve organizational performance (Smith and McKeen, 2000).*

Several international defence forces are exploring and incorporating KM principles and strategies for sharing and reconfiguring defence knowledge. The Department of Defense (United States), Ministry of Defence (United Kingdom), and the Australian Defence Forces are investigating various issues in KM and more effective strategies and techniques for leveraging defence knowledge.[1] The Department of National Defence (DND) and the Canadian Forces (CF) are beginning to explore the significance of KM—focusing on knowledge assets for improving products and services. Discussions, symposia and research[2] on KM are being conducted and documented to better understand the critical issues in KM.

The main objective of the workshop was to determine if DND/CF should be moving towards a KM strategy. The following paper documents the results of the workshop, focusing on two particular themes: (i) the current perceptions of KM, including the elements for capturing, using, sharing and reusing knowledge within DND/CF; and (ii) the future directions and implications of investing in a DND/CF KM strategy. This paper reports on the results of the workshop and puts forward several recommendations for future investigation.

---

[1] For a more comprehensive overview of knowledge management within the defence environment, please see Waruszynski, B. 2001. *Moving Towards a Knowledge Investment Strategy—An Analytical Overview of the Science and Technology Community.* DRDC TM 2000-003. Directorate of Science and Technology Policy.

[2] Waruszynski, B. 2000. *The Knowledge Revolution—A Literature Review.* DRDC TM 2000-002. Directorate of Science and Technology Policy; and, Waruszynski, B. 2001. *Moving Towards a Knowledge Investment Strategy—An Analytical Overview of the Science and Technology Community.* DRDC TM 2000-003. Directorate of Science and Technology Policy.

2 Research Approach and Methodology

An interactive knowledge management (KM) workshop was conducted to obtain a collective understanding of KM within DND/CF. Twelve participants were initially invited to take part in the interactive KM workshop conducted at the Department of National Defence Headquarters on 11 October 2001. One participant was not available; and 11 participants engaged in the full day workshop (0830 to 1600). The workshop participants were selected as key representatives who are examining KM in DND/CF. These participants represented a balanced selection of defence personnel who are engaged in KM discussions. On the civilian side, the workshop participants included: two defence scientists, two computer specialists, one librarian and one strategy and policy advisor. On the military side, the participants included: one Commander (Navy), two LCol (Army, Air Force), and two Majors (Army, Air Force).

Participants were given background material prior to the interactive KM workshop, including: the workshop agenda and a paper on KM, entitled: *The Knowledge Revolution: A Literature Review*[3]. This material was intended for participants to have a good understanding of KM and to be familiar with the structure of the workshop. At the workshop, a presentation on KM was given to the group to ensure that participants were familiar and comfortable with the working definitions of KM.

The Decision Support Systems (DSS) lab in National Defence Headquarters—incorporating 12 computer workstations in a U-shaped format and a projection screen located at the front of the room—was used to help facilitate the discussions throughout the day. This system is known as GroupSystems®, also related to Group Decision Support System (GDSS). The software is used to provide computer-supported group decision-making (e.g., generating ideas, organizing ideas, consensus building, conducting evaluations, voting, and decision analysis).

For this workshop, GroupSystems® was defined to be the most effective tool to help stimulate discussion, generate ideas and facilitate consensus on particular issues. The facilitator explained how to use the system, and helped to stimulate discussions to ensure that the objectives of the workshop were met. By employing GroupSystems®, the discussions throughout the workshop were documented automatically within the system. Each workshop activity invited participants to record their comments on particular issues, thereby maintaining a complete dossier of the comments. The participants were able to examine their comments, engage in group discussions and obtain group decisions. Comments were displayed on the projection screen; although participant anonymity was maintained to ensure increased group member participation.

To move forward, the workshop members needed a collective understanding of KM within DND/CF. To achieve this collective understanding, it was important to examine the current perceptions of KM and the elements for capturing, using, sharing and reusing knowledge.

The workshop participants focused on the following questions:

(a) How do you see KM fitting into your organization?

(b) What are the enablers and barriers to knowledge capture, use, transfer and reuse faced by organizations?

(c) What are the tools, technologies and techniques that enable people to capture, use, share and reuse their knowledge?

---

[3] See Barbara Waruszynski on *The Knowledge Revolution: A Literature Review*. Technical Memorandum 2000-002, Defence R&D Canada, 2000.

(d) What are the similarities and differences between KM for the corporate environment and KM for the warfighter?

(e) What are the internal and external collaborative partnerships or alliances within DND/CF?

These questions helped to establish a baseline. With a good representation of DND/CF representatives, the workshop helped to determine the current situation of knowledge leveraging techniques, mechanisms, approaches and technologies in conducting everyday work.

The future directions and implications of KM requirements for organizations were also hypothesized. The benefits, risks and costs were examined for each of the questions that were identified in the first part of the workshop. This part of the workshop addressed whether DND/CF should be moving towards a KM strategy.

3 Results

The results of the interactive KM workshop represent a snap shot of the current perceptions of KM within the Canadian defence environment. These results provide a synthesis of the workshop findings, and offer greater insight into some of the key KM issues facing DND/CF in the future.

Workshop Expectations

The participants were asked about their specific expectations of participating in the interactive KM workshop. The participants' expectations identified several issues, including: understanding KM and its application to the defence environment; being more cognizant of where Canadian defence positions itself on the topic of KM; being able to share knowledge with the rest of the defence community; and understanding the application of information management to KM.

The responses are outlined in Table 1:

Table 1 Participants' Expectations of Participating in Workshop

- *To learn as much as I can about the KM process in order to share the information with colleagues.*
- *To share what I know, learn what I can adopt/adapt, influence the way ahead in the Department.*
- *[To] share our knowledge in KM, creating this way new knowledge.*
- *To share ideas and broaden ideas in the field. [paraphrased]*
- *To learn more about Departmental understanding of and attitudes toward KM.*
- *[To] get a snap shot of where the department is and where we should be going.*
- *To consider the various opinions of attendees. There is quite a controversy whether or not KM is a new consultant buzz-word, like re-engineering was, or a new representation of common sense, or a new art or science.*
- *To develop a shared understanding of how KM might be developed and applied in DND/CF and to find the similarities between KM in corporate and military operational environments.*
- *To understand KM. [paraphrased]*
- *[To] bring specific tool sets to operations for better leverage of IM/IT and what KM can do to influence this.*
- *[To determine] what training I need to bring to operations via a focus on KM*
- *[To determine if] the AF [is] ready for this move in management structure.*
- *[To determine] what is the AF strategy that will influence my direction.*
- *[To attain a] broader understanding of KM and the linkages with Information Management and Data Management so these perspectives can be addressed in our Information Management Strategy and Architecture. I also hope to influence the direction that DND/CF KM takes considering Information Architecture and Standards leveraging these areas.*

Current Perceptions of Knowledge Management

Perceptions of Knowledge Management Fitting into Own Organization

Participants were asked *How do you see KM fitting into your organization?* In Table 2, the responses are presented under the following categories: culture, information management/information technology, people/human capital, and leadership and management.

The participants saw KM fitting into their organization by understanding the *culture* for enabling a knowledge sharing organization. Issues surrounding the culture mainly identified transferring knowledge across organizations (e.g., sharing best practices, lessons learned, cross-disciplinary fertilization); encouraging innovative thinking; and capturing the tacit knowledge of workers—the knowledge that is embedded in people' heads.

Issues that fell under *information management/information technology* were mostly concerned with the speed of getting information, improving decision-making capabilities, and putting forward effective information management and information technology standards.

Human capital, the people within the organization, were also integral to KM. The issues mainly focused on training and development (e.g., reducing learning curves in new employees; performance recognition; promoting continuous improvement; clarification of roles; and leveraging human resources).

Finally, *leadership and management* were also important factors, focusing on senior management support of KM, and the definition and development of KM strategies and frameworks.

Table 2 Perceptions of Knowledge Management Fitting into Own Organization

Culture ➢ Share best practices between directorates ➢ Create and share lessons learned ➢ Cross-disciplinary fertilization ➢ Better transfer of knowledge between science and technology and CF (better knowledge of military requirements by research staff) ➢ Foster innovation ➢ Capture tacit knowledge before it walks out the door
Information Management/Information Technology ➢ Improve speed at which people can obtain relevant information to do their jobs ➢ Improve decision-making process (i.e., delegation, speed, quality) ➢ Align corporate and operational information management/ information technology to satisfy KM interests ➢ Develop and implement information standards to contribute to sharing and re-use ➢ Defence Terminology Management
People/Human Capital ➢ Reduce learning curves in new employees ➢ Performance recognition: contribution that empower people in the accomplishment of their functions ➢ Promote continuous improvement ➢ Leverage human resources ➢ Clarify roles and responsibilities of the directorates and how they apply to shared projects (to avoid duplication)
Leadership and Management ➢ Introducing KM is impossible if leaders are not convinced. It should start at the top. Required culture changes cannot start anywhere else than at the top. ➢ Definition and development of KM strategies and framework

Two participants provided negative feedback, stating:

> *I see pursuit of a KM strategy and framework as a drain on resources that distracts the group from other more important activities.*
>
> *[KM is depicted as being] 'painful'.*

Enablers for Creating/Fostering a Knowledge Management Environment

Participants were asked: *What are some enablers for creating/fostering a KM environment within DND/CF?* In Table 3, the results are categorized under management support and information management/information technology.

Management support issues were important for enabling a KM environment. Participants stated that senior management needs to be committed to supporting a KM environment, and needs to apply KM to the mission, strategic defence management initiatives and programs.

Information management/information technology issues were also important and focused on how information is structured, accessed and transferred.

Other issues concentrated on continuous training and how KM could prevent future terrorist activities through better connectivity and communication.

Table 3 Enablers for Fostering a Knowledge Management Environment

Management Support
➢ Commitment from senior management
➢ Understanding by senior leadership (particularly), (and all of us) of the concept of KM—contribution of KM to mission accomplishment
➢ Mutually understood mission
➢ Make KM part of the modern management agenda
➢ Implementation of a KM organization, change management program and employee incentive program
Information Management/Information Technology
➢ Content Management (i.e., content management not only technology; relationship management between information items)
➢ Solid understanding of information management/ information technology as a pre-requisite
➢ Visualization of context based information
➢ Technology (e.g., portals, connectivity, accessibility, availability)
Other
➢ Initial and ongoing training
➢ The World Trade Center disaster

One participant expressed a negative view about the application of KM within DND/CF, stating that KM has yet to demonstrate its value:

> *KM must first demonstrate its value. I believe that KM has not yet earned and does not yet merit the attention and resources that it is attracting in ADM (S&T) and ADM (IM). This question thus has a negative connotation for me: that KM is being fostered is the result of bad management practices and lack of focus.*

Barriers to Creating/Fostering a Knowledge Management Environment

Participants were asked: *What are some barriers to creating/fostering a KM environment within DND/CF?* Table 4 puts forward the barriers to creating/fostering a KM environment. These barriers are categorized under culture, information management/information technology, human resources and management support.

The organizational *cultural* barriers to facilitating a KM environment were mainly associated with the organizational make-up and bureaucracy (e.g., chain of command, stovepipe mentality, resistance to change, lack of encouragement for employing knowledge sharing tools and collaborative working methods, and lack of KM ownership).

The barriers surrounding *information management/information technology* issues concentrated on poorly defined, developed and applied information management technologies and work practices.

Barriers involving *people* (i.e., human resources) focused on lack of time and resources for workers to foster a KM environment (e.g., overburdening of staff due to lack of time; scant expertise).

Finally, *management support* issues revolved around the lack of management support and decision-making techniques.

Table 4 Barriers to Fostering a Knowledge Management Environment

Culture
➢ Organization structure (i.e., hierarchy and rank, chain of command, stovepipe thinking, knowledge fragmentation, knowledge as power)
➢ Tradition
➢ Individual's resistance to change as information technology is introduced
➢ Organization does not value collaborative work (we are not physically organized to encourage team/ collaborative work nor are there tools to promote sharing)
➢ Lack of demonstrated value, combined with pervasive suspicion about management fads
➢ Fragmentation/lack of ownership of KM process for implementation across the department
➢ Head-on collision between the culture required for KM (e.g., sharing information) and the culture of the security community (one source of knowledge for the warfighter) where the culture favours fragmenting knowledge between people for security reasons
➢ Lack of exchange between projects/initiatives; don't have time/motivation to share
➢ Conflicting priorities
➢ Red tape
➢ Cost and time are main drivers vice quality
➢ Organization size and geographical distribution
➢ Inability to measure the effectiveness
➢ Lack of structure with regard to the tacit knowledge
Information Management/Information Technology
➢ Poor information management practices
➢ Belief that Information Management can do it all
➢ Inadequate technology, connectivity
➢ Access to same information among intelligence, operations and corporate communities: intelligence, operations and corporate communities want to bring people together; however, organizational structures do not always allow it.
➢ Multiple communications systems/networks
Human Resources
➢ Overburdening of staff (lack of time)
➢ Scant expertise (isolated experts without colleagues with whom to share and grow)
➢ Roles too narrowly defined by position rather than knowledge
➢ Mandate and resources are not compatible
Management Support
➢ Lack of buy-in and support from upper management
➢ Decision-making styles

Tools and Technologies for Capturing, Using, Sharing and Reusing Knowledge

Participants were asked: *What are some specific tools (including technologies) that enable people to capture, use, share and reuse their knowledge?* In Table 5, the responses ranged from knowledge portals to career management systems. These tools and technologies help to promote collaboration, greater communication and access to information for better decision-making capabilities. These tools and technologies enable accessibility, connectivity, searching capabilities, categorization and messaging of information and knowledge (e.g., knowledge portals, repositories for best practices and lessons learned, expertise databases and departmental software applications).

Table 5 Tools and Technologies for Knowledge Workflows

Knowledge portals
Lessons Learned / Learning Logs
Task Support Services (Best Practices Exchange; Help Desk)
Yellow Pages (identifying experts)
Reusing elements of earlier projects (documents in new submission)
Collaborative tools (planning tools, GroupWare services and applications; asynchronous collaborative tools, networking for communities of interest)
Situational Awareness tools
3D and Advanced Visualization
Text and Data Mining
Knowledge Maps - context layer - ontology - hypertext
Project Management Tables
Human Intelligence: Brain/Memory of the individual
Filtering tools- advanced viewer - knowledge workspaces - semantic & contextual search engines – knowledge board
Enterprise Applications (e.g., PeopleSoft software)
Literature – scientific, engineering, newsletters, published information
Cataloguing of Information Holdings and access
Individual and group Web sites
E-mails
Access to appropriate networks (Internet, intranet, classified networks, etc.)
Career Management System (i.e., career progression model; professional development model; occupational analysis system; and job classification system)

Techniques for Capturing, Using, Sharing and Reusing Knowledge

Participants were asked: *What are some specific techniques that enable people to capture, use, share and reuse their knowledge?* In Table 6, techniques involving *networked groups* were the most important (e.g., communities of practice; joint working groups; and sharing experiences in informal group settings). These networked groups encourage free-flowing discussions to stimulate creative ideas and approaches to problem-solving and decision-making.

Participants also identified processes for enabling a KM environment (e.g., indexing of information for easier retrieval, benchmarking, competency management, and exercises).

Cultural issues were also important factors, focusing on creating and establishing an environment that promotes knowledge sharing. A KM culture involves leadership support and commitment, with incentives and benefits for encouraging people to share their know-how and expertise.

Table 6 Knowledge Management Techniques

Networked Groups
➢ Communities of Practice
➢ Interdisciplinary teams—new ideas, avoiding groupthink
➢ Creating associative lists to link information items in different ways to improve the ability for different people to gain access to particular facts
➢ Chatting on your experience and listening to others
➢ Joint working groups
➢ Asking a colleague
➢ Coaching / Mentoring program
➢ Sharing of experience in informal groups (e.g., coffee klatch model)
Processes
➢ Indexing of information to enable retrieval
➢ Experimentation
➢ Benchmarking
➢ Communication (e.g., briefings, training courses, workshops)
➢ Career Development Process - staffing process (Balance between cross-pollination and experience; talent retention; competency management (career grooming))
➢ Field trials
➢ Exercises
Culture
➢ Incentives and progressing benefits to encourage people to contribute to and stay in the KM culture; leadership support
➢ Activate and maintain a "spiral on knowledge creation and sharing"
➢ Creativity-fostering culture (flexibility and open minds)

Similarities and Differences Between Knowledge Management for the Corporate and Operational Environments

Understanding the similarities and differences between KM for the corporate environment and KM for the warfighter (i.e., military operational environment) is integral to understanding how KM could benefit the defence environment. Participants were asked: *What are the similarities between KM for the corporate environment and KM for the warfighter?* In Table 7, the similarities are categorized under processes, information and culture.

Issues revolving around *processes* mainly concentrated on the management of knowledge leveraging processes.

Issues surrounding *information* were aimed at the quality, quantity, relevancy and urgency of the information (e.g., conflicting information; relevant information available in a timely fashion and in a useable format).

Cultural issues focused on the need to share and know information, and political aspects.

Table 7 Similarities Between Knowledge Management for the Corporate and Operational Environments

Processes
➢ Same processes for gaining knowledge
➢ Methodologically identical processes
➢ Adequate global KM process and framework (not yet established in either environment)
➢ Life cycle management
Information
➢ Information overload
➢ Requirement for data fusion in an environment of conflicting information (i.e., which information to use)
➢ Requirement for relevant information available in a timely fashion and in a useable format
➢ Urgency, response time can be measured in seconds at tactical level, hours at the operational to weeks at strategic levels
Culture
➢ The notion of need-to-share
➢ The notion of need-to-know
➢ Politics

There were only a few *differences* between KM for the corporate environment and KM for the operational environment. Participants were asked: *What are the differences between KM for the warfighter and KM for the corporate environment?* In Table 8, contextual issues, including the consequence of error during military operations, were the main differences. Other issues revolving around career management and the content itself were also reported.

Table 8 Differences Between Knowledge Management for the Corporate and Operational Environments

Context
➢ Context (operations primacy)
➢ Consequence of error is different in magnitude and context (reliability of the information is critical)
➢ Must be deployable (warfighting)
Other
➢ Career management vs. professional development
➢ The content itself (not its form)

Internal Partnerships in Leveraging Knowledge

Participants were asked: *What internal (within DND/CF) collaborative partnerships or strategic alliances, if any, does your organization engage in to leverage knowledge?* In Table 9, participants mainly focused on collaborative associations with level one organizations, advisory groups, boards, and committees as examples of their internal partnerships. These collaborative associations mainly involve participants engaging in discussions with individuals and with various working groups to help leverage their knowledge.

Table 9 Examples of Internal Partnerships in Leveraging Knowledge

R&D Advisory Groups
R&D Program Board
All Level One organizations (in general)
MARLANT (CoP for Balanced Scorecard and within FMFCS) MARLANT and DSC
ADM HR (OA, IT and CT) and Career Management processes drive our informal KM
ADM(IM) have collaborated in KM initiatives • IM Group - Director of Enterprise Architecture, DGIMSD/ Governance/Policy area, Projects with IM component, CIOs • IMG on governance issues in the classified domain
COS J3, the CFCS Proj Mgr, and the CFCS Support staff
CFMWC System Effectiveness Groups (SEG's)
PDs of the CAS, CLS & CMS Operational level C2IS projects
Joint Staff Steering Committee and Joint Staff Action Team to deal with support to operations
C4 ISR oversight Committee, the C2 Steering Committee and the C2 Ops WG on strategies to improve IM & KM for the DCDS in support of CF Ops
DAR, DJFC, and D Air Proj
ADM (OCIPEP)
D IM Secur
76 Comm Gp
CAS, ICAD, Wings and Squadrons through WG's, committees

External Partnerships in Leveraging Knowledge

Participants were also asked: *What external collaborative partnerships or strategic alliances, if any, does your organization engage in to acquire knowledge?* In Table 10, the main external partnerships were with the Canadian Federal Government, international militaries and other informal communities.

Table 10 Examples of External Partnerships in Leveraging Knowledge

Canadian Federal Government
➢ OGDs *(general)*
➢ National Research Council
➢ Health Canada
➢ TB *(federated architecture)*
➢ CSIS
➢ RCMP
➢ DFAIT
➢ PCO
➢ CCMD
➢ CCEB
➢ CWAN T
➢ MIC
International Militaries
➢ Allies *(general)*
➢ NATO *(including NATO Terminology Standardization)*
➢ NORAD
➢ TTCP
➢ USAF
➢ US Navy (KM CoP)
➢ Network Centric Innovation Centre (NCIC)
➢ Joint Warrior Interoperability Demonstrations
Others
➢ Intellink community
➢ Universities and other educational institutions
➢ Informal liaison, networking, sharing with communities
➢ Consulting Firms: Partnership with DMR to develop and share expertise on KM

Future Directions of Knowledge Management

In understanding the future directions of KM within the Canadian defence environment, participants were asked to prioritize the issues that were examined earlier. The workshop participants voted on the top three issues that needed to be discussed. The prioritized areas included: barriers to KM (six responses); enablers to KM (five responses); specific tools and technologies to KM (four responses); and specific techniques in KM (four responses). Although participants prioritized the issues, they were given the opportunity to further comment on all of the issues (based on the questions) that were explored in the morning's session. As a result, participants were asked to explore these issues in greater depth by focusing on the associated benefits, risks and costs.

Enablers to Knowledge Management: Benefits, Risks and Costs

Table 11 outlines the benefits, risks and costs for the enablers of KM.

The main benefits for enabling a KM environment can be categorized under culture and information management. According to the participants, the *cultural* benefits included a defence environment that promotes success, encourages creativity and supports continuous improvement.

The *information management* benefits focused on document management processes and the requirement for knowledge leveraging tools.

Similarly, the risks are categorized under culture and information management. *Cultural* risks mainly focused on investing in a KM infrastructure that may not improve current work methods (e.g., not taking KM very seriously or investing in KM (i.e., creating the infrastructure) and employees are reluctant to support the new environment).

Information management risks referred to not fully understanding the requirements of a KM infrastructure (e.g., lack of agreement in choosing the best methods or setting too high expectations for IM/IT in enabling knowledge sharing).

The costs of enabling a KM environment included monetary costs and dedication of human resources.

Table 11 Enablers to Knowledge Management: Benefits, Risks and Costs

Benefits	Risks	Costs
Culture ➢ Build on success ➢ Focus on positive ➢ Economy of scale ➢ Create environment that would support KM ➢ Foster creativity and continuous learning ➢ CF mission success ➢ Identify enablers that will open the door to conducting a needs analysis ➢ Deliver a working solution not a promise	***Culture*** ➢ Abandon past work ➢ Danger of paying only lip service to KM philosophy ➢ Huge efforts for uncertain return ➢ Build it and they still might not come ➢ Must satisfy a real need/problem, or opportunity, not a technological marvel ➢ Identify small achievable tasks with relatively low cost to avoid the risk of trying to tackle the whole problem with no tangible short term results ➢ Define the requirements for KM first, otherwise we could concentrate on removing barriers and identifying enablers without a clear requirement(s) defined	***Return-on-investment*** ➢ Low costs ➢ Change of attitude does not need to be procured via PWGSC ➢ Incur large bureaucratic overhead if process becomes focus rather than outcomes ➢ Development of supporting IM/IT enablers will consume a large proportion of staff effort in the relevant Level One organizations, but a relatively small proportion of the Department's annual budget (However, in a virtual deficit situation, even this small fixed and recurring cost may be difficult to afford) ➢ Will be expensive, needs team support
Information Management ➢ Information synergy in a period of resource shortage ➢ Eliminate redundancy of information ➢ Version control and accessibility to authoritative documents ➢ Already have robust KM environment; however tools are deficient	***Information Management*** ➢ Lack of agreement in choosing the best method ➢ Creating more legacy systems ➢ Putting more demands on the IM ➢ Risk making too much out of IM/IT enablers than they represent in the KM domain, and we risk setting expectations too high	
Resources ➢ Economy of resources		

Barriers to Knowledge Management: Benefits, Risks and Costs

Participants were asked to assess the benefits, risks and costs associated with the barriers to KM. In Table 12, the benefits mainly focused on fostering a KM environment, and examining more effective strategies for delineating and instituting KM.

The issues revolving around the risks included: concentration of efforts on negative aspects; resistance to change; and lack of interoperability between organizations.

The costs mainly involved cultural and financial issues (e.g., organizational change and upheaval; IT systems may be cost prohibitive).

Table 12 Barriers to Knowledge Management: Benefits, Risks and Costs

Benefits	Risks	Costs
➢ Awareness of what the obstacles are and where they lie in order to address them ➢ See benefits of fostering enablers ➢ Enterprise strategy, reuse of experience ➢ Elimination of barriers to KM may have secondary benefits ➢ Allows focusing the energy on the right problems ➢ Contributing to an effective action plan ➢ Often easier to remove resistance than to overcome resistance ➢ It is important to identify the factors that would restrict us from implementing KM, in order to plan a strategy to address or remove them.	➢ People may prefer to abandon the whole process if there is too much focus on barriers ➢ Resistance to change ➢ Lack of interoperability ➢ Contrary to delegated funding model	➢ Loss of control ➢ Organizational change and upheaval ➢ Roll out of large IT systems may be cost prohibitive ➢ Culture change is not easy

Tools and Technologies for Knowledge Management: Benefits, Risks and Costs

Participants were asked to assess the benefits, risks and costs associated with the tools and technologies for KM. In Table 13, the benefits include identifying and employing the tools and technologies for advancing opportunities in the defence environment (e.g., support new opportunities for collaboration and cross-pollination).

The risks mainly concentrated on the need to identify the needs and requirements for the tools, technologies and techniques for leveraging knowledge (e.g., jump at technological solutions without complete consideration of outcomes and consequences; and push too far in the development of tools before senior management has vetted the KM approach).

The costs were attributed to management and financial issues (e.g., fostering a candy store mentality versus requirements driven model; and supporting management costs and sustainability issues).

Table 13 Tools and Technologies for Knowledge Management: Benefits, Risks and Costs

Benefits	Risks	Costs
➢ Harvest low hanging fruit ➢ New opportunities for collaboration and cross-pollination ➢ Single capture for multi-purpose needs ➢ Identification of KM projects with technology components (what have we thought of already in terms of tool requirements)	➢ Focus on capabilities vs. capabilities required (leads to lack of standardization if not centrally controlled) ➢ Define the requirements for KM first (otherwise we could buy ineffective tools without clearly defined requirement(s)) ➢ Jumping at technological solutions without complete consideration of outcomes and consequences ➢ Without identifying the technique it will be difficult to identify the proper tool ➢ Risk in pushing too far in the development of tools before seniors have vetted the KM approach ➢ The tool is useless if not used properly ➢ Integration requirements (creating islands of information)	➢ Fosters candy store mentality vice requirements driven model ➢ Even the cheapest tool is too expensive if no one uses it ➢ Either large investment or cost prohibitive ➢ Life support management costs and sustainability issues

Techniques for Knowledge Management: Benefits, Risks and Costs

Participants were asked to assess the benefits, risks and costs associated with the techniques employed in KM. In Table 14, the benefits mainly focused on implementing effective and innovative techniques for capturing knowledge and new opportunities within the defence community (e.g., to help facilitate needed resources; and to explore new opportunities to share knowledge with new partners). Other benefits focused on providing a continuous improvement environment and employing KM for advancing strategic defence initiatives.

The risks involved the inability to define which techniques would be appropriate and successful for leveraging knowledge (e.g., lack of agreement on best technique; difficulty in quantifying success).

The costs mainly focused on the impact on human resources (e.g., additional human resources for core tasks; and imposing a new strategy on an already challenged staff).

Table 14 Techniques for Knowledge Management: Benefits, Risks and Costs

Benefits	Risks	Costs
➢ Identify technique to facilitate identification of required resources ➢ Identify sources of information not recognized by the department although important to its operations (permits information capture) ➢ New opportunities for innovation ➢ New opportunities to share knowledge with new partners ➢ Create support if rolled out successfully and solve real problems ➢ Allow employees to broaden the way in which they can contribute ➢ Conduct continuous improvement concepts ➢ KM perspective on strategic planning and strategic management, augmenting capability, financial, policy and other perspectives	➢ Lack of agreement on best technique may inhibit the implementation process ➢ Time may be viewed as unproductive; difficult to quantify success ➢ Difficult to get time for "experimentation" without corporate direction and buy-in; requires continual "marketing/ communication" effort on part of the champion ➢ Flawed understanding of the nature of KM ➢ Some techniques are low-risk by design, like trying to assess the risk of using common sense	➢ May require additional human resources for core tasks (quality of output issue) ➢ Difficult to obtain critical mass if you start here, may jeopardize acceptance of the entire KM concept ➢ The view of corporate KM strategy to which I subscribe would impose a new step in an already cumbersome Departmental strategic planning process Moreover, it's substance might unleash a host of initiatives to overwhelm an already challenged staff. The key is to focus on the critical few initiatives, and to phase our work.

Similarities Between Knowledge Management for the Corporate and Operational Environments: Benefits, Risks and Costs

Participants were asked to assess the benefits, risks and costs associated with the similarities between KM for the corporate environment and KM for the operational environment. In Table 15, the benefits mainly focused on standardizing the knowledge requirements and architecture for knowledge use and transfer within both corporate and operational environments, and identifying common knowledge requirements. Other benefits revolved around identifying the requirements for enhanced collaboration, and building credibility for best practices in KM.

The risks focused on both environments supporting KM initiatives.

Costs included changing the current architecture and business processes to meet KM requirements.

Table 15 Similarities Between Knowledge Management for the Corporate and Operational Environments: Benefits, Risks and Costs

Benefits	Risks	Costs
➢ Standardize the process - economies of scale ➢ Ability to reuse data shared by common business processes ➢ Standardization of architecture ➢ Ability to identify common knowledge requirements for the benefit of both the warfighter and corporate user ➢ Identification and starting points for collaboration ➢ Building credibility for the KM best practices in the corporate arena may influence its insertion in the more hermetic warfighter scenario ➢ Sharing and reuse	➢ Buy-in ➢ Defining common requirements (time consuming process) ➢ Lose operations supremacy	➢ Modification of network architectures and business processes

Differences Between Knowledge Management for the Corporate and Operational Environments: Benefits, Risks and Costs

Participants were asked to assess the benefits, risks and costs associated with the differences between KM for the corporate environment and KM for the operator. In Table 16, the benefits mainly focused on standardizing the business processes for both the corporate and warfighter environments (e.g., tools and techniques).

The risks suggested that processes and perceptions would not enable a KM environment (e.g., difference in quantity, quality, speed and relevancy of information; loss of different perspectives of various communities; loss of sight of corporate commonality; and jeopardizing the need for collaboration).

The cost implications focused on the need to standardize systems and processes for both the corporate and operational environments. It was suggested that there is a need to be more connected to avoid sustainability and functionality problems.

Table 16 Differences Between Knowledge Management for the Corporate and Operational Environments: Benefits, Risks and Costs

Benefits	Risks	Costs
➢ Standardize the process - economies of scale ➢ Recognize differences in context ➢ Identify necessary unique applications, tools or requirements to determine suitable accountabilities	➢ Difference in quantity, quality, speed and relevancy of the information ➢ Lose different perspectives of various communities (ops, corp, scientific) ➢ Lose sight of corporate commonality which is greater than few differences that could slow down the process ➢ Drive a wedge between camps and jeopardize the need for more collaboration	➢ Emphasis on differences has gotten us where we are now - not sustainable ➢ Duplicated systems for similar activities and process ➢ More demand on IM/IT interfaces ➢ More disfunctionality

Internal Collaborative Partnerships: Benefits, Risks and Costs

Participants were asked to assess the benefits, risks and costs associated with internal collaborative partnerships. In Table 17, the benefits were generally attributed to the ability of leveraging one's knowledge (e.g., employing best practices; being able to provide more appropriate support to CF).

The risks were mainly attributed to the loss of individual influences over the outcomes (e.g., the loss of different perspectives of various communities; and adding complexity to solutions or way ahead).

The costs referred to the integration of system networks for all communities.

Table 17 Internal Collaborative Partnerships: Benefits, Risks and Costs

Benefits	Risks	Costs
➢ Best practices: who is using KM and how ➢ Expanding the scope ➢ More appropriate support of the CF when requirements understood	➢ Lose the different perspectives of various communities (ops, corp, scientific) ➢ Adding complexity to solutions or way ahead ➢ Higher priorities may suffer ➢ Devoting resources before knowing the specific requirements (cost/benefit)	➢ Integrate networks, applications and data stores across the corp, ops and scientific communities

External Collaborative Partnerships: Benefits, Risks and Costs

Participants were asked to assess the benefits, risks and costs associated with external collaborative partnerships. In Table 18, the benefits mainly centred around leveraging knowledge through international information sharing and collaboration.

The risks focussed on protecting departmental information (e.g., data spillage and protection of our intellectual property).

The cost implications concentrated on systems for protecting national data that resulted from collaborative partnerships.

Table 18 External Collaborative Partnerships: Benefits, Risks and Costs

Benefits	Risks	Costs
➢ Who is using KM and how (best practices) ➢ International information sharing and collaborative planning between coalition members and allies ➢ Contribution to Government on Line (GOL) objectives ➢ Risk sharing ➢ Leveraging of knowledge from other organizations	➢ Data spillage ➢ Protection of our intellectual property	➢ Increased cost to protect national data generated by establishing international networks

Attitudinal Survey

Towards the end of the workshop, a survey was conducted to determine group perceptions of investing in a KM strategy for DND and the CF. Four participants were unavailable; therefore, seven participants responded to the survey. Participants read several statements and were asked their level of agreement for each statement. A five-point Likert Scale was used to determine and understand the degree of convergence on particular statements. This linear scale provided varying degrees of intensity, employing the following categories: Strongly Agree (5), Agree (4), Neutral (3), Disagree (2) and Strongly Disagree (1). The results are put forward after each statement.

Statement: We should be moving towards a KM strategy.

In Table 19, the majority of the group (five out of seven participants) agreed that we should be moving towards a KM strategy. Only one person strongly disagreed with this statement and another felt neutral.

Table 19 ***We should be moving towards a KM strategy.***

Strongly Agree	3
Agree	2
Neutral	1
Disagree	0
Strongly Disagree	1
Total (N)	7

Participants had the opportunity to comment on the above statement, and put forward the following positive comments:

> *KM is required to ensure that we are leveraging our resources to the maximum extent possible.*
>
> *KM cannot be perceived as merely the newest management fad or flavour of the month, but rather as an integral way to capture and transfer knowledge. This may then allow for buy-in from key stakeholders.*
>
> *It is critical that we record and transfer knowledge in a common way to ensure ease of access and continuous improvement.*
>
> *The KM strategy must be adopted throughout DND, only then will it be worthwhile. Everyone needs to be sold on the need for such a strategy and the benefit we can derive from it.*
>
> *In the deliberations moving towards a Strategy, we will be able to define KM for DND/CF as long as we are honest about who we are and what our mission is. The Strategy can keep the department on a more unified approach rather than if individual organizations initiate their own strategies and concepts in isolation.*

Two participants held negative views, stating:

> *We must not move towards a KM strategy because we do not yet have a satisfactory shared understanding of what KM is. I would change my response if I were confident that we had grasped KM and if we were united in our desire to pursue it (from top to bottom and across the organization).*
>
> *Need to address other areas first such as a corporate IM strategy to allow information centric architecture before we tackle KM.*

Statement: The benefits of a KM strategy outweigh the costs.

In Table 20, only three out of seven participants agreed that the benefits of a KM strategy would outweigh the costs. The majority of the participants were neutral in their attitudes.

Table 20 The benefits of a KM strategy outweigh the 'costs'.

Strongly Agree	1
Agree	2
Neutral	4
Disagree	0
Strongly Disagree	0
Total (N)	7

Participants had the opportunity to comment on the above statement, and put forward the following neutral comments:

> *A discussion of the perceived benefits would be required.*
>
> *So long as we are ready to implement one. Not sure that we are there yet.*
>
> *Don't know, we will have to define the requirements and do a cost/benefit analysis to determine this.*

Statement: The benefits of a KM strategy outweigh the risks.

By examining Table 21, the majority of respondents (four out of seven) were neutral in their attitudes toward the benefits of a KM strategy outweighing the risks. Only two agreed and one disagreed with this statement.

Table 21 The benefits of a KM strategy outweigh the 'risks'.

Strongly Agree	0
Agree	2
Neutral	4
Disagree	1
Strongly Disagree	0
Total (N)	7

Participants had the opportunity to comment on the above statement, and put forward the following neutral comments:

> *A discussion of the perceived benefits would be required.*
>
> *Risks may outweigh the benefits if not properly thought out and married with an IM framework.*
>
> *The benefit/risk/cost analysis will have to be done before this can be answered.*

Statement: The KM strategy would be the same for the Warfighter as for the Corporate environment.

In Table 22, the majority of respondents (five out of seven) agreed that the KM strategy would be the same for the operations and corporate environments. Two participants disagreed with this statement.

Table 22 The KM strategy would be the same for the Warfighter as for the Corporate environment.

Strongly Agree	3
Agree	2
Neutral	0
Disagree	2
Strongly Disagree	0
Total (N)	7

Participants had the opportunity to comment on the above statement, and put forward the following comments:

The strategy should be the same; the content and context will differ.

The information require its timeliness and context may vary but the needs for information and process are the same. Greater distinction between Strat, Op and Tac than between corp and warfighter.

Appears to be the same but urgency for implementation might give KM for the warfighter priority.

Statements: Involvement in Knowledge Management—Occupational Groups

Participants were also asked to provide their level of agreement with respect to particular occupational groups. In Table 23, the participants were very clear on including human resources professionals in the development of a KM strategy. On the other hand, participants were divided on including information management/information technology professionals and librarians.

Table 23 Involvement in Knowledge Management—Occupational Groups

	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**	**Total (N)**
Human Resources	5	0	0	1	1	7
Information Management/ Information Technology	3	0	1	2	1	7
Librarians	3	0	1	2	1	7

Participants had the opportunity to express their opinions on other occupational groups or classifications that would be relevant in developing a KM strategy. Comments included:

Senior management.

Communications.

IM/IT are the supporting infrastructure personnel and data organization and relevant associative search capability (which I classify as a librarian function) are key. We need to get away from making individuals their own information managers.

IM Governance structure: Information Managers and Information Architects.

I see HR, IM/IT and information holdings functions as[providing] supporting plans, with heavy emphasis on HR, given the unalterably human nature of knowledge.

The Commander must play the leading role, by setting the overarching corporate strategy.

Staff representatives from every area[should be] represented when KM systems/ techniques apply.

Statements: Level of Agreement on DND/CF Organizational Groups

Participants were asked their level of agreement on who would be involved in developing a KM strategy. By examining Table 24, participants gave exceptionally high ratings for the majority of organizational groups within DND/CF. The Deputy Chief of Defence Staff (DCDS) had the highest rating (mean=4.71), where 100 per cent of the participants agreed that this organization should be involved in the development of a KM strategy (five strongly agreed and two agreed). VCDS, ADM HR Mil, ADM HR Civ, ADM IM, CAS, CLS and CMS organizations also received high ratings.

Table 24 Level of Agreement on DND/CF Organizational Groups

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean Score	STD	Total (N=7)
DCDS	5	2	0	0	0	4.71	0.49	100% (7)
VCDS	4	3	0	0	0	4.57	0.53	100% (7)
ADM HR Mil	4	3	0	0	0	4.57	0.53	100% (7)
ADM HR Civ	4	2	1	0	0	4.43	0.79	100% (7)
ADM IM	4	2	0	1	0	4.29	1.11	100% (7)
CAS	3	3	1	0	0	4.29	0.76	100% (7)
CLS	3	3	1	0	0	4.29	0.76	100% (7)
CMS	3	3	1	0	0	4.29	0.76	100% (7)
ADM OCIPEP	3	1	2	1	0	3.86	1.21	100% (7)
ADM S&T	3	1	2	1	0	3.86	1.21	100% (7)
ADM POL	2	2	2	1	0	3.71	1.11	100% (7)
ADM FIN CS	2	2	0	2	0	3.67	1.37	100% (6)
ADM MAT	2	2	1	1	1	3.43	1.51	100% (7)
ADM IE	1	2	2	1	1	3.14	1.35	100% (7)

Participants provided comments with respect to organizational groups, including:

The CDS and DM should be included in this list: they are responsible for corporate strategy. I rate VCDS as high because his staff do the corporate strategy work.

Fundamentally, everyone should be involved.

Workshop Objectives

At the very end of the interactive KM workshop, participants were asked if the objectives of the workshop were met. The vast majority of participants acknowledged that the objectives were met; while only one person disagreed. Moreover, participants had a chance to comment on the positive elements of the workshop. The main comments revolved around high participation and flow of discussion between various key players. Participants also had a chance to comment on the elements of the workshop that could have gone better. The comments included: increased duration of the workshop (e.g., two days for a more enhanced review of KM); increased participation by other relevant personnel; and improved discussion flows.

4 Application of Knowledge Management in the Canadian Defence Environment—Discussion of Key Findings

A DND/CF Knowledge Management Strategy:

The workshop results suggest that DND/CF should be moving towards a KM strategy. This strategy will need to integrate the common KM needs and requirements for better leveraging knowledge across the defence community. Such a strategy will require senior management support, and will need to be tied into the departmental core values and the DND/CF strategic objectives.

Before investing in a KM strategy, it will be contingent upon DND/CF to further explore the benefits, risks and costs of a KM infrastructure, and how this infrastructure will contribute to the effectiveness and efficiency of producing high quality defence products and services. Supporting evidence for further exploring the benefits, risks and costs lies in the ambivalence of the participants in assessing whether the benefits of a KM strategy would outweigh the risks and costs. Further examination of the benefits, risks and costs (e.g., cost/benefit analysis) will be required to fully understand how KM principles may enhance the efficacy of defence services, products and client relations.

Enablers and Barriers for Fostering a Knowledge Management Environment within DND/CF:

The key enablers for fostering a KM environment within DND/CF involved leadership support and information management/information technology. For instance, the workshop participants stated that senior management needs to be committed to a KM environment, and needs to apply KM in strategic defence management initiatives and programs. Issues in information management and technology focused on how information is structured, accessed and transferred.

The barriers, on the other hand, mainly focused on issues surrounding culture, information management/information technology, human resources and management support. The organizational cultural barriers to a KM environment were mainly associated with the organizational make-up and bureaucracy (e.g., chain of command, stovepipe mentality, resistance to change, lack of encouragement of tools for knowledge sharing and collaborative working methods and lack of KM ownership). Poorly defined, developed and applied information management technologies and work practices were also problematic. Barriers involving people focused on lack of time and resources for workers to foster a KM environment.

In general, the participants see KM fitting into their organization by promoting a culture that enables knowledge sharing (e.g., sharing best practices and lessons learned); encourages innovative thinking; and helps to capture the tacit knowledge of its workers (i.e., the knowledge

that resides in people's heads). Information management and information technology are also considered to be important factors for enhancing the speed of getting information and improving decision-making capabilities. Moreover, KM principles could enhance personnel training and development by reducing learning curves in new employees and promoting a continuous improvement working environment.

It is important to further examine the cultural, management, information technology and human resources issues for enabling a KM environment. In a traditional command and control environment, adapting to organizational changes generally takes time—especially when people are introduced to new management concepts and processes (e.g., KM seen as being the latest fad). As the workshop participants noted, there will always be some resistance to change. There are opportunities, however, that could help foster a KM environment and reinforce the desired behaviours through rewards and recognition programs.

Incorporating Corporate and Operational Environments for a Knowledge Management Strategy:

Understanding the similarities and differences between KM for the corporate environment and KM for the military operations environment is important, and needs to be addressed prior to moving towards a KM strategy within DND/CF. The majority of respondents agreed that the strategy should incorporate both the corporate and operational environments. The strategy should be the same, including the needs and requirements for process and information; however, the content and context will differ. One participant stated that the urgency for KM implementation may give priority to the operator.

The participants agreed that working towards a unified KM strategy will enable better capture, use and transfer of knowledge for both the corporate and warfighter environments. It will also be important to further examine the contexts in the way DND/CF personnel conduct their work, and how KM may benefit both the corporate and operational environments as well as the partnership between the two environments.

Working within Internal and External Communities for Communicating and Networking Emerging Defence Issues:

Collaborative strategies, such as the development and implementation of internal and external communities (e.g., communities of practice), represent successful KM applications for sharing and transferring knowledge. According to the workshop participants, internal partnerships mainly involve collaborative associations with departmental organizations, advisory groups, boards, and committees. External partnerships are also integral to everyday work, creating linkages and alliances between DND/CF and the Canadian Federal Government, international militaries and other communities.

Throughout the development and implementation of a KM strategy, it is integral to realize the importance of communities and how they enable collaborative working environments. Successful communities of practice are contingent upon senior management and working level support mechanisms.

Developing Tools and Technologies for Promoting Collaboration, Communication and Access to Information:

Participants emphasized that tools and technologies help to promote collaboration, greater communication and access to information for better decision-making capabilities. These tools and technologies enable accessibility, connectivity, searching capabilities, categorization and messaging of information and knowledge (e.g., knowledge portals, repositories for best practices and lessons learned, expertise databases). Techniques, on the other hand, involve groups of people encouraging free-flowing discussions to stimulate creative ideas and approaches to problem-solving and decision-making.

Management needs to examine what current and emerging tools, technologies and techniques would enable knowledge to be shared, transferred and reconfigured into new knowledge across organizations. Data mining and visualization tools, for example, demonstrate how technology can assist organizations in advancing the knowledge discovery process. Information technologies and systems, on the other hand, are critical to maximizing operational effectiveness. For KM to succeed, it is integral to employ tools, technologies and techniques within a common architecture.

Understanding the differences between information management systems and KM systems for enhanced organizational performance is critical for the KM strategy. Information management systems and technologies have paved the way to knowledge collaboration; however, information systems (e.g., document management systems, databases/repositories) have different objectives than KM systems. Information management systems focus on the management of information for better content/document management and processing. KM tools and technologies focus on bringing know-how together through the support of technologies and through connecting individuals and communities across local and wide-area networks for leveraging knowledge. Thus, the information management infrastructure strategic plan must support a KM environment. Creating a KM model and linking it to the overall information management/information technology strategic plan will help to understand the supporting relationships and interrelationships between the two management strategies. Thus, designing a KM architecture (e.g., tools, technologies and techniques) is a key component of a KM strategy.

Investing in People for Knowledge Leveraging:

The participants agreed that the investment in people (i.e., the human capital) within the organizations is the most important part of knowledge leveraging. The issues focus on: reducing learning curves in new employees; performance recognition (i.e., empowering people in their accomplishments); and promoting continuous improvement. One of the components for enabling a KM environment is to foster creativity and continuous learning. The participants emphasized the importance of sustaining and nurturing a culture that promotes continuous learning.

Human resources professionals are key to developing a strategy that supports individual and group learning for leveraging knowledge across the department. It is important to realize that military and civilian personnel come from different organizational learning environments. As a result, it will be important for human resources professionals to work in partnership with employees to develop a training program for enhancing individual skills and competencies. In addition, managers and designated personnel should use their skills as coaches, mentors and facilitators of a learning program. Participants noted that techniques involving mentoring and coaching are designed to help organizations improve the retention of corporate tacit knowledge—to impart the knowledge and wisdom to the next generation of employees.

A knowledge management environment will only be successful if it encourages learning for continuous improvement. Adapting to a changing environment means that DND/CF must invest

in the learning process, ensuring that its civilian and military personnel have the opportunities to enhance their skills and knowledge for advancing departmental strategic initiatives.

5 Conclusion

The majority of participants indicated that DND/CF should be moving towards a KM strategy. The move from concept to reality will depend on understanding the culture, people, processes and technological issues for advancing KM within the Canadian defence environment. Further analysis of the benefits, risks and costs is needed to support the development of a KM strategy.

Enabling a KM environment will require further examination of the cultural, management, information technology and human resources issues. It will be a challenge to embed KM into the core practices. However, incentives will need to be provided to achieve the desired behaviours for leveraging knowledge.

To align the needs and requirements of the corporate and operational environments, a KM strategy will need to identify the benefits in leveraging knowledge across the strategic, tactical and operational levels. An integrated approach to a KM strategy will help define the defence community needs for building, linking and converting organizational knowledge into new knowledge. Understanding the differences in context between the corporate and operational environments is essential for an integrated KM environment.

Staying connected and working within functional communities will enable defence employees to successfully execute departmental tasks. Collaborative strategies, such as the development and implementation of communities of practice, will promote successful KM applications for the advancement of new defence knowledge.

Specific tools, technologies and techniques will help to help to support knowledge creation and innovation. Understanding the differences between information management and KM will also be essential. A KM architecture (i.e., the tools, technologies and techniques for knowledge flow and sharing) will be a key component of a KM strategy.

To move toward a KM strategy, DND/CF should invest in the learning process, ensuring that its civilian and military personnel have the opportunities to enhance their skills and knowledge. It is important to sustain and nurture a culture that promotes continuous learning at all levels. Whether defence is accelerating information operations management, battlespace environmental technologies or warfighting tactics on the battlefield, providing an environment that embraces institutional learning will only strengthen the defence community.

Investing in a KM defence strategy will have many implications for the Canadian defence community. Issues surrounding leadership, cultural practices, people and technologies will be used as levers for the development and implementation of a defence KM strategy.

6 Recommendations

In understanding and responding to the key findings, several recommendations are put forward:

1. *Develop a common understanding of knowledge management:* The Department and the CF need a common understanding of what KM is and needs to differentiate it from information management.

2. *Identify the current knowledge management-related practices within DND/CF:* After developing a common understanding of KM, it is important to identify and link the current KM-related initiatives that are helping to leverage knowledge across DND/CF.

3. *Explore the knowledge management needs and requirements for the corporate and operational environments:* For KM to benefit DND/CF, it is necessary to further explore the specific KM needs and requirements for the corporate and operational environments. It will be important to examine the contextual issues that differentiate the corporate worker from the operator.

4. *Examine the architectural environment options for leveraging knowledge better across organizations/units:* The architecture (i.e., the tools, technologies and techniques) needs to work in conjunction with the requirements set out by DND/CF. This will involve an inventory and a more thorough understanding of the existing tools and technologies that will help to support knowledge leveraging initiatives.

5. *Identify the benefits, risks and costs involved in the development and implementation of specific defence knowledge management initiatives:* This work will help to prioritize various actions and introduce KM in an orderly fashion.

6. *Invest in the learning process:* Based on maximizing return-on-investment, we should invest in training, tools and techniques to implement a KM strategy.

7 References

American Productivity and Quality Center (APQC). (2000). *Knowledge Management: A Guide for your Journey to Best-Practice Processes.* APQC's Passport to Success Series. Carla O'Dell, Susan Elliott and Cindy Hubert.

Smith, Heather and James McKeen. (2000). *Creating and Facilitating Communities of Practice.* Queens KM Forum 2000. Queens Management Research Center for Knowledge Based Enterprises School of Business, Queens University Kingston.

Waruszynski, Barbara. (2000). *The Knowledge Revolution—A Literature Review.* Defence R&D Canada, TM 2000-002.

Waruszynski, B. (2001). *Moving Towards a Knowledge Investment Strategy—An Analytical Overview of the Science and Technology Community.* DRDC TM 2000-003. Defence R&D Canada.

DOCUMENT CONTROL DATA SHEET		
1a.PERFORMING AGENCY Defence R&D Canada		**2. SECURITY CLASSIFICATION** Unclassified
1b.PUBLISHING AGENCY Defence R&D Canada		
3. TITLE (U) Knowledge Management Within the Canadian Defence Environment		
4.AUTHOR Waruszynski, Barbara Theresa		
5.DATEOF PUBLICATION December, 2001		**6.NO.OF PAGES**
7.DESCRIPTIVE NOTES		
8.SPONSORING/MONITORING/CONTRACTING/TASKING AGENCY		
9.ORIGINATORS DOCUMENT NUMBER Technical Memorandum 2001-008	**10.CONTRACT,GRANT THRUST AND/OR PROJECT NO.** 20 ae	**11.OTHER DOCUMENT NOS.**
12.DOCUMENT RELEASABILITY Unlimited distribution		
13.DOCUMENT ANNOUNCEMENT Unlimited		

14.ABSTRACT

An interactive knowledge management (KM) workshop was conducted to assess the current perceptions and future directions of KM within the Department of National Defence (DND) and the Canadian Forces (CF). The main objective of the workshop was to determine if DND/CF should be moving towards a KM strategy. The following paper documents the results of the workshop, focusing on two particular themes: (i) the current perceptions of KM, including the elements for capturing, using, sharing and reusing knowledge within DND/CF; and (ii) the future directions and implications of investing in a DND/CF KM strategy. Several key findings are put forward for understanding the application of KM to the Canadian defence environment. First, DND/CF should be moving towards a KM strategy. Second, the key enablers for fostering a KM environment within DND/CF are leadership and information management/information technology. Third, the KM strategy should incorporate both the corporate and operational environments. Fourth, working within internal and external communities is essential for communicating and networking on emerging issues in defence. Fifth, tools and technologies should be developed to promote collaboration, greater communication and access to information. Finally, the investment in people within organizations is the most important component of knowledge leveraging.

15.KEYWORDS,DESCRIPTORS or IDENTIFIERS

(U) Knowledge; Knowledge Management; Interactive Knowledge Management Workshop; Defence; Warfighter; Collaboration; Communities of Practice; organizational learning; tools and techniques; Decision Support Systems.